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## Claims

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

- 1. A method for performing progressive data acquisition in a sensor web environment, comprising: 5 using data from a first sensor, one or more surrounding sensors, and from a base station, whereby to attain optimal data acquisition of dynamic event where the location and time of such events cannot be anticipated.
  - 2. The method of claim 1, wherein the utilization of data from surrounding sensors is done in an opportunistic way where no prior scheduling is performed.
  - 3. A sensor subsystem for use in a system comprising one or more other similar sensor subsystems and a base processing system, the sensor subsystem comprising:
    - a. Two or more data sources for gathering parameter data;
    - b. A data summarizer which fuses parameter data gathered by two or more data sources to create an abstract data parameter;
    - c. A progressive model, which takes as input abstract data parameters, and generates an output data model; and
    - d. Means, which takes as input the output data model and derives an optimized schedule for
      - i. (i) subsequent gathering of data by the sensor subsystem and
      - ii. (ii) subsequent transmission of model data to the base processing station
    - e. so as to maximize accuracy of a data model executed by the base station.
  - 4. The sensor subsystem of claim 3, wherein the data sources include a data source on board the sensor subsystem, as well as a second sensor subsystem.
- 5. The subsystem of claim 3, wherein the data summarizer fuses data by using one or more of the following techniques: spatial interpolation, temporal extrapolation, and error 25 concealment.
  - 6. The subsystem of claim 3, wherein the input and output of the progressive model includes an uncertainty estimate.
- 7. A base processing system for use in a system comprising two or more sensor subsystems, the base processing system comprising: 30

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- a. Two or more data sources for gathering parameter data, at least one of the data sources being a sensor subsystem for generating model representing data gathered by two or more sensor subsystems;
- b. A data summarizer which fuses parameter data gathered by the two or more data sources to create an abstract data parameter;
- c. A progressive model which takes as input abstract data parameters and generates an output data model upon which a decision maker can base a decision.
- 8. The base processing system of claim 7, wherein the model generated by the sensor subsystem includes an uncertainty estimate.
- 9. A method, performed by a first remote sensor subsystem, for enabling the a first remote sensor subsystem to opportunistically collaborate with one or more other remote sensor subsystems in a system comprising two or more sensor subsystems and a base processing system, the method comprising:
  - a. Performing a model based processing of information collected by sensors located on board the first remote sensor subsystem;
  - b. Seeking out one or more neighboring remote sensor subsystems;
  - c. If there is a neighboring remote sensor subsystem, passing information to the neighboring remote sensor subsystem, and if not, transmitting the information to the base processing system.
- 20 10. The method of claim 9, wherein step b further comprises exchanging information with one or more neighboring remote sensor subsystems to determine the capabilities of such neighboring remote sensor subsystems.
  - 11. The method of claim 9, wherein only information critical to collaborative processing is passed from the first remote sensor subsystem to the neighboring sensor subsystem.
- 25 12. The method of claim 9, wherein the first remote sensor subsystem stores critical information on board for future processing.